What is claimed is:

1. A transgenic non-human animal whose cells contain a DNA sequence comprising:

(a) a nerve tissue specific promoter operatively linked to a DNA sequence which encodes amyloid-beta peptide alcohol dehydrogenase (ABAD), and

(b) a nerve tissue specific promoter operatively linked to a DNA sequence encoding a mutant human amyloid precursor protein hAPP695, hAPP751 and hAPP770 bearing mutations linked to familial Alzheimer's disease in humans,

wherein said non-human animal exhibits at least one phenotype from the group consisting of: reduced basal synaptic transmission; inhibited synaptic plasticity; increased neuronal stress; elevated 4-hydroxynonenal in cerebral cortex; increased heme oxygenase type I in cerebral cortex; decreased synaptophysin in cerebral cortex; decreased micortubule-associated protein 2 in cerebral cortex; and increased levels of activated caspase 3 antigen in cortical neurons.

2. The transgenic non-human animal of claim 1, wherein the promoter of both element (a) and (b) is platelet derived growth factor (PDGF)-B-chain promoter.

3. The transgenic non-human animal of claim 1, wherein the non-human animal is a mouse, a rat, a sheep, a dog, a primate, or a reptile.

4. The transgenic non-human animal of claim 1, wherein the animal is a mammal.

5. A method for evaluating in a non-human transgenic animal the potential therapeutic effect of an agent for treating Alzheimer's disease in a human, which comprises:

(a) providing an agent to a transgenic non-human animal whose cells comprise

(i) a nerve tissue specific promoter operatively linked to a DNA sequence which encodes amyloid-beta peptide alcohol dehydrogenase (ABAD), and

(ii) a nerve tissue specific promoter operatively linked to a DNA sequence encoding a mutant human amyloid precursor protein hAPP695, hAPP751 and hAPP770 bearing mutations linked to familial Alzheimer's disease,

(b) determining the therapeutic effect of the agent on the transgenic non-human animal by monitoring basal synaptic transmission or synaptic plasticity, wherein an increase in basal synaptic transmission or synaptic plasticity indicates that the agent would have a potential therapeutic effect on Alzheimer's disease in a human.

6. The method of claim 5, wherein the promoter of both element (a) and (b) is platelet derived growth factor (PDGF)-B-chain promoter.

7. The method of claim 5, wherein the non-human animal is a mouse, a rat, a sheep, a dog, a primate, or a reptile.

5 8. The method of claim 5, wherein the animal is a mammal.